Dometic® The Sign of Comfort

RECORD THIS UNIT INFORMATION FOR FUTURE REFERENCE:
Model Number _____
Serial Number _____
Date Purchased _____

Ducted caravan roof MOUNT AIR CONDITIONER

MODEL B3351.533

used with

3105007 Return Air Cover

and wall mounted

3310086 Analog Relay Kit Cool, Furnace, Heat Strip

SERVICE OFFICE
Dometic Corporation
For Information
Contact:
www.dometic.com

This Unit Is Designed For Installation By
Original Equipment Manufacturers ONLY.
All Initial Installations Must Be Approved By Dometic

⚠ WARNING

This manual must be read and understood before installation, adjustment, service, or maintenance is performed. This unit must be installed by a qualified service technician. Modification of this product can be extremely hazardous and could result in personal injury or property damage.

INSTALLATION INSTRUCTIONS

TYPE

B3351.533

AIR CONDITIONER

Form No. 3311156.000 12/06
©2006 Dometic Corporation
LaGrange, IN 46761

Important: These Instructions must stay with unit.
Owner read carefully.

SAFETY INSTRUCTIONS

This manual has safety information and instructions to help users eliminate or reduce the risk of accidents and injuries.

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating instructions.

UNDERSTAND SIGNAL WORDS

A signal word , **WARNING** OR **CAUTION** is used with the safety-alert symbol. They give the level of risk for potential injury.

⚠ WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates, a potentially hazardous situation which, if not avoided, may result in property damage.

Read and follow all safety information and instructions.

1. GENERAL INFORMATION

A. Product features or specifications as described or illustrated are subject to change without notice.
The following are the basic requirements:

1. Installation opening. Cut through the roof and ceiling.
2. Additional Wiring.
   220-240 VAC, 50 Hz. 10 Amp.
3. Power with the air conditioner on must be above 209 VAC and the frequency must be at 50 HZ. at all times.

B. This Air Conditioner Is Designed For:

1. Installation on a Caravan during the time the vehicle is manufactured.
2. Mounting on the roof of a Caravan.
3. Roof construction with rafters/joists on minimum of 40.6 cm centers.
4. Minimum of 5 cm and maximum of 10 cm distance between roof to ceiling of Caravan.

C. The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the Caravan.
Some preventative measures taken by the occupants of the Caravan can reduce the heat gain and improve the performance of the air conditioner. During extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:

1. Parking the Caravan in a shaded area
2. Using window shades (blinds and/or curtains)
3. Keeping windows and doors shut or minimizing usage
4. Avoiding the use of heat producing appliances

Operation on High Fan/Cooling mode will give optimum or maximum efficiency in high humidity or high outside temperatures.

Starting the air conditioner early in the morning and giving it a "head start" on the expected high outdoor ambient will greatly improve its ability to maintain the desired indoor temperature.

For a more permanent solution to high heat gain, accessories like Dometic A&E outdoor patio and window awnings will reduce heat gain by removing the direct sun. They also add a nice area to enjoy company during the cool of the evening.

D. Condensation

Note: The manufacturer of this air conditioner will not be responsible for damage caused by condensed moisture on ceilings or other surfaces. Air contains moisture and this moisture tends to condense on cold surfaces. When air enters the Caravan, condensed moisture may appear on the ceiling, windows, metal parts, etc. The air conditioner removes this moisture from the air during normal operation. Keeping doors and windows closed when this air conditioner is in operation will minimize condensed moisture on cold surfaces.

SPECIFICATIONS

Type			B3351.533 Air Cond	Electric Heater
Nominal Capacity (KW)			3.2	1.6
Electrical Rating	220 -240 VAC 50 Hz. 1Ph.			
FL Amps (Comp/Motor)			5.3/0.7	6.3/1.6
LR Amps (Comp/Motor			22/4.4	--/4.4
Power (KW)			1.3	1.9
Refrigerant Grams/Oz			R22 510/18.0	
Min. Wire Size	Up to 8 meters, use 1.5mm^2 Copper			
Circuit Protection	10 Amp Time Delay Fuse or 10 Amp Circuit Breaker			
Generator Size	1 Unit 3.5 KW 2 Units 5.0 KW			

The Manufacturer gives only general guidelines for Generator requirements. These Generator requirements come from experiences consumers have with our equipment in field applications. When sizing Generators, the total electrical power consumption of the caravan must be considered. Keep in mind that Generators lose power because of altitude increase above sea level, high outside temperatures and lack of maintenance.

2. INSTALLATION INSTRUCTIONS

A. Precautions

⚠WARNING

Improper installation may damage equipment/ could endanger life, cause serious injury and/ or property damage.

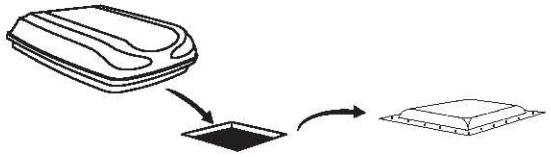
1. Read Installation and Operating Instructions carefully before attempting to start your air conditioner installation.
2. Dometic Corporation will not be liable for any damages or injury incurred due to failure in following these instructions.
3. Installation must comply with applicable codes or regulations.
4. **DO NOT** add any devices or accessories to this air conditioner except those specifically authorized by Dometic.
5. This equipment must be serviced by qualified personnel and some localities require these people to be licensed.

B. CHOOSING PROPER LOCATION FOR THE AIR CONDITIONER

1 This air conditioner is specifically designed for installation on the roof of a Caravan. When determining your cooling requirements, the following should be considered:
   a. Size of caravan.
   b. Window area (increases heat gain).
   c. Amount of insulation in walls and roof;
   d. Geographical location where the caravan will be used.
   e. Personal comfort level required.

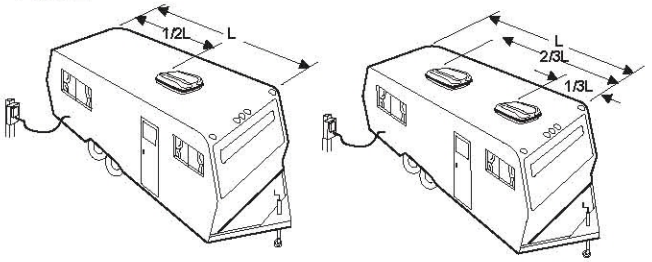
2. Normal Location-The air conditioner is designed to fit over an existing roof vent opening. When the vent is removed, it normally creates a 35.5 cm x 35.5 cm opening. See FIG. 1.

FIG. 1



3. Other Locations-When no roof vent is available or another location is desired, the following is recommended:
   a. For one unit installation :
   The air conditioner should be mounted slightly forward of the center (front to back) and centered from side to side on the Caravan. See FIG. 2.

FIG. 2



L = Length

   b. For two unit installations:
   Install one air conditioner 1/3 and the other 2/3's back from the front of the caravan and centered from side to side. See FIG. 2.

4. Check the location acceptability before beginning the installation.
   a. If possible mount the air conditioner in a section of the roof which is both flat and level when the caravan is parked on a level surface
      - Up to a 15° slant to either side or front-to-back is acceptable on B3351.533 Air conditioner **ONLY**.
   b. Check on the roof to insure no obstructions are in the area where the air conditioner will be installed. See FIG. 4, 4A, 5 & 5A.
   c. Check inside the Caravan for return air cover obstructions (i.e. door openings, room dividers, curtains, ceiling fixtures, etc.) See FIG. 6.

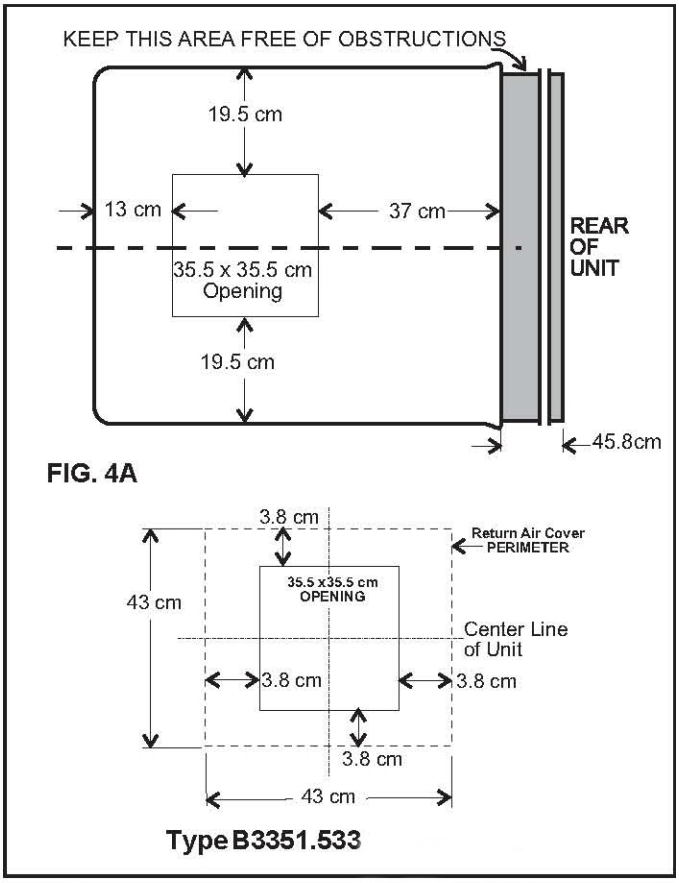
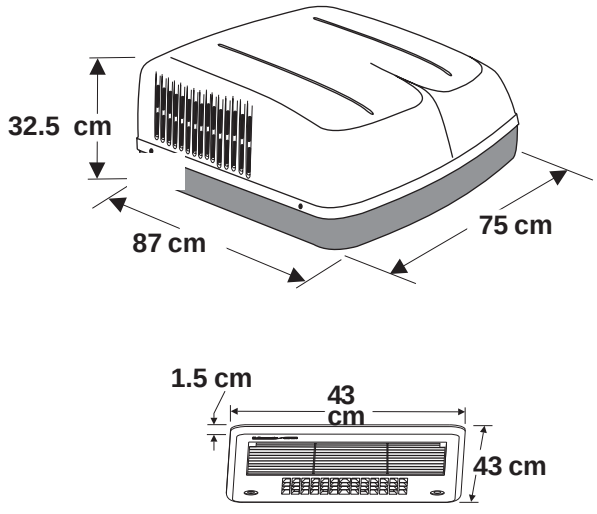


FIG. 5A



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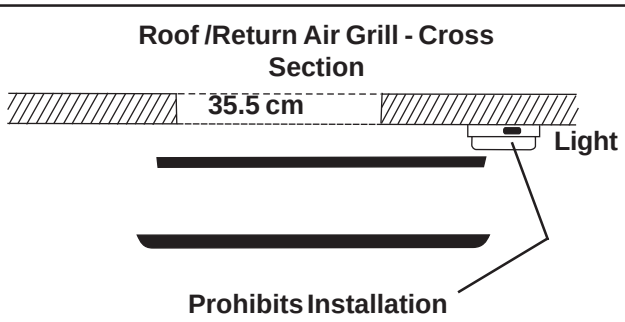
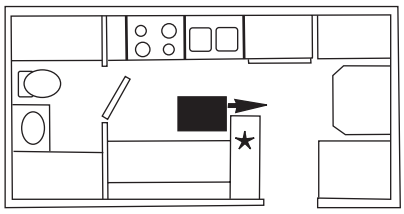


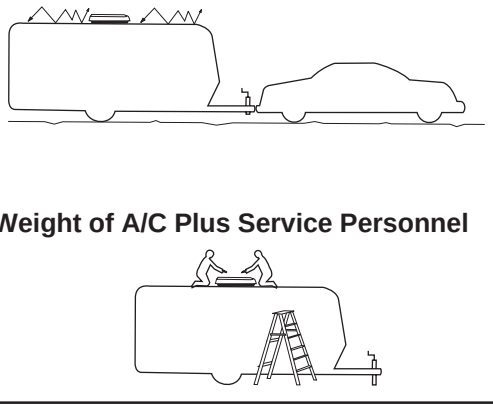
FIG. 6



★ Cabinet - Prohibits Use

d. The roof must be designed to support 60 Kg. when the Caravan is in motion. Normally a 90 Kg. static load design will meet this requirement. See FIG. 7.

FIG. 7

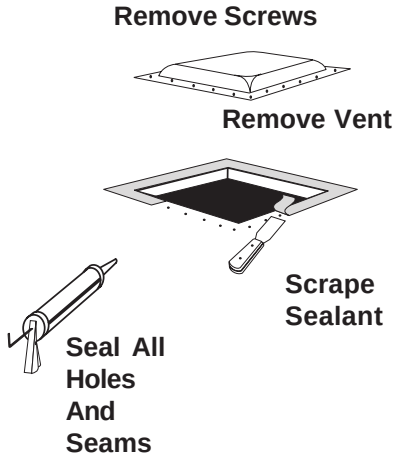


C. ROOF PREPARATIONS

The 35.5 cm x 35.5 cm opening is part of the return air system of the Air Conditioner and must be finished in accordance with any national or local codes.

1. Roof Vent Locations:
   a. Remove all screws that secure the vent to the roof and remove the vent from the opening.
   b. Remove all sealing compound from around the vent opening.
   c. Seal all screw holes and all roof seams with a quality all weather sealant. See FIG. 8.

FIG. 8

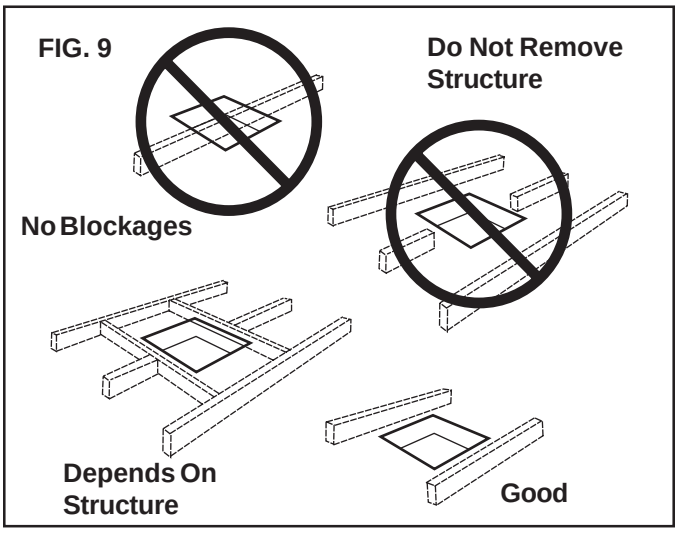


   d. If the opening is less than 35 cm x 35 cm, it must be enlarged.
   e. If the opening exceeds 36 cm x 36 cm, it will be necessary to install spacers.
2. New Opening (installation other than vent opening)

⚠ WARNING

There may be electrical wiring between the roof and the ceiling. Disconnect 220 - 240 volt AC power cord and the positive (+) 12 volt DC terminal at the supply battery. Failure to follow this instruction may create a shock hazard causing death or severe personal injury.

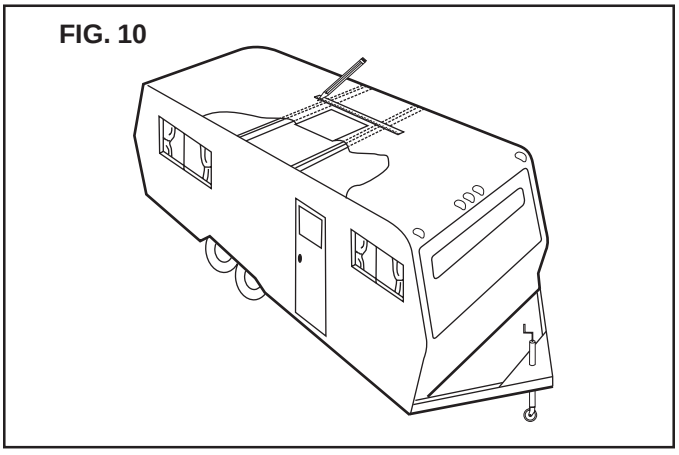
a. If a roof vent opening will not be used a 35.5 cm x 35.5 cm opening must be cut through the roof and ceiling of the Caravan. This opening must be located between the roof reinforcing members. See FIG. 9.

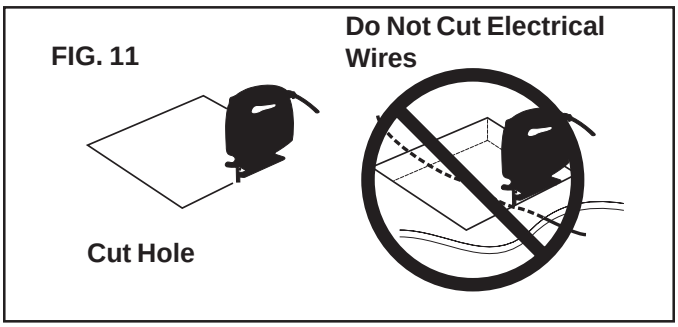


b. Mark a 35.5 cm x 35.5 cm square on the roof and carefully cut the opening. See. FIG. 10, 11 & 12.
c. Using the roof opening as a guide, cut the matching hole in the ceiling.

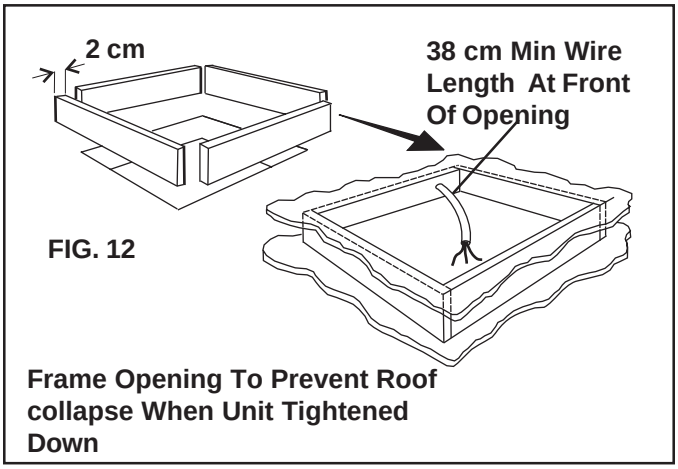
CAUTION

It is the responsibility of the installer of this air conditioner system to ensure structural integrity of the Caravan roof. Never create a low spot on the roof where water will collect. Water standing around the air conditioner may leak into the interior causing damage to the product and the Caravan.





d. The opening created must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Lumber 2 cm or more in thickness must be used. See FIG. 12.



Remember to provide an entrance hole for power supplies, furnace wiring, and control cable.

D. AIR DISTRIBUTION SYSTEM SIZING & DESIGN

The Installer of this air conditioner system must design the air distribution system for their particular application. Several requirements for this system **MUST** be met for the air conditioner to operate properly. These requirements are as follows:

1. All discharge air ducts must be properly insulated to prevent condensation from forming on their surfaces or adjacent surfaces during operation of the air conditioner. This insulation must be R-7 minimum.
2. Ducts and their joints must be sealed to prevent condensation from forming on adjacent surfaces during operation of the air conditioner.
3. Return air openings must have 260 cm^2 minimum free area including the filter.
4. Return air to the air conditioner must be filtered to prevent dirt accumulation on air conditioner cooling surface.

E. AIR DISTRIBUTION DUCTED SYSTEM INSTALLATION

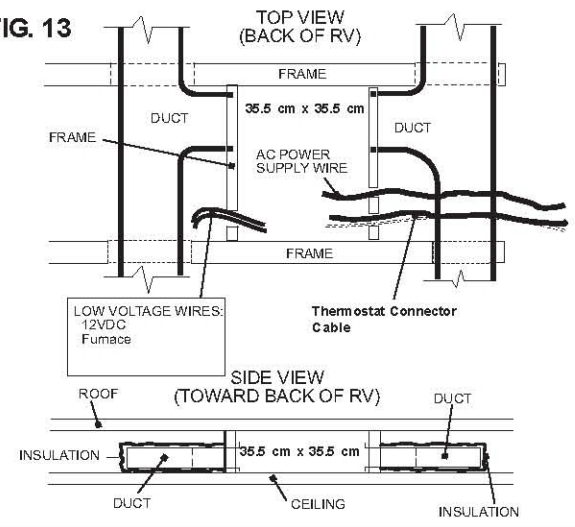
1. Dometic Corporation recommends the basic configuration shown in FIG. 13, for installing this air conditioner system. We have found by testing, that this configuration works best in most applications of this air conditioner system. It is the responsibility of the Installer of this system to review each Caravan floor plan and determine the following:
   a. Duct size
   b. Duct layout
   c. Register size
   d. Register location
   e. Thermostat location
2. These items must be determined in conjunction with the Air Distribution System and Sizing and Design Requirements listed in the chart on page 6. Terminate the start of the duct at the back edge of the 35.5 cm x 35.5 cm opening. See FIG. 13 and 14.

AIR DISTRIBUTION DUCT SIZING & DESIGN CHART

Return Air Cover Model	3105007
Roof Cavity Depth	5 cm Min. - 14 cm Max.
Duct Cross Sectional Area	144 cm^2 Min.
Duct Size	
Depth	4 cm Min. - 6.5 cm Max.
Width	18 cm Min. - 25 cm. Max.
Total Duct Length	4.6 M Min. - 12.2 M Max.
Duct Length (short run)	1/3 Total Duct Length
Register Requirements	
Number Required Per Run	2 Min.
Free Air Area Per Register	90 cm^2 Min.
Distance From Duct End	12.5 cm Min. - 20 cm Max.
Distance From Elbow	4 cm
Duct Static	
Blower at High Speed, Filter & Grill In Place	30 - 160 Pa

Note: Duct sizes listed are inside dimensions.

FIG. 13

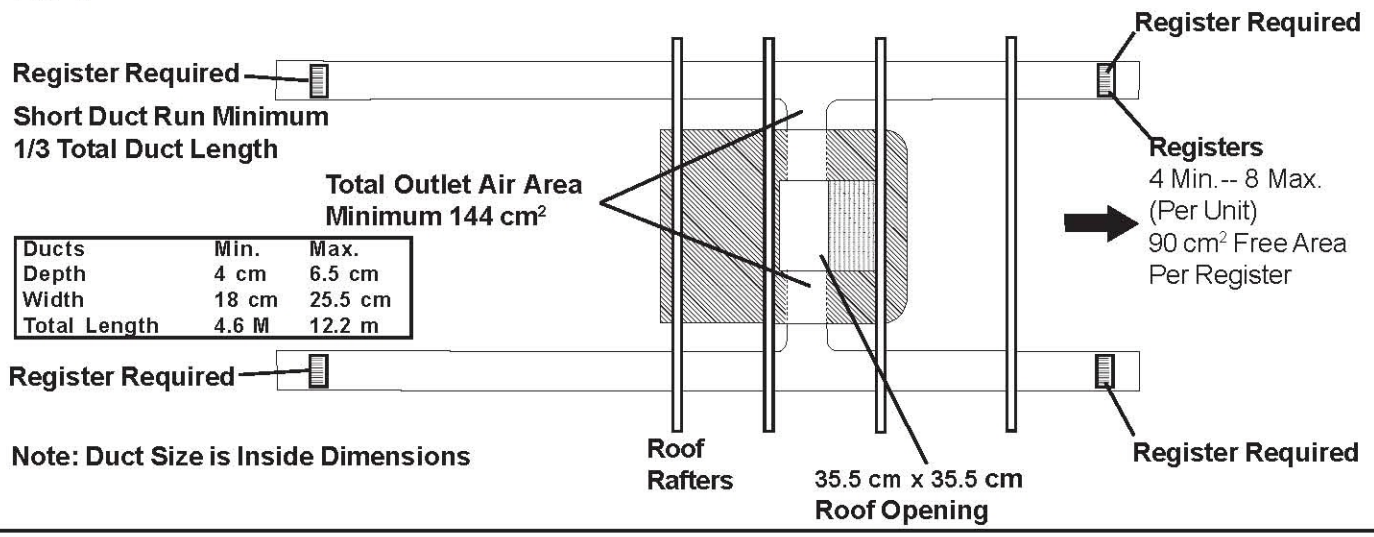


CAUTION

It is the responsibility of the installer to insure the ductwork will not collapse or bend during and after the installation. Dometic Corporation will not be liable for roof structural or ceiling damage due to improperly insulated, sealed or collapsed ductwork.

Duct Size And Requirements For 3105007 Return Air Cover

FIG. 14



F. WIRING REQUIREMENTS

1. Route a copper 1.5 mm^2, with ground, 220 - 240 VAC supply line from the time delay fuse or circuit breaker box to the roof opening.
   a. This supply line must be located in the front portion of the 35.5 cm x 35.5 cm opening.
   b. The power MUST be on a separate 10 Amp time delay fuse or 10 Amp circuit breaker.
   c. Make sure that at least 38 cm of supply wire extends into the roof opening. This ensures an easy connection at the junction box.
   d. Wiring must comply with all National and Local Wiring Codes.
   e. Use a steel sleeve and a grommet or equivalent methods to protect the wire where it passes into the opening.
2. Route a dedicated 12 VDC supply line (0.50 mm^2 to 0.75 mm^2) from the Caravan's converter (filtered terminals) or battery to the roof opening.
   a. This supply line must be located in the front portion of the 35.5 cm x 35.5 cm opening.
   b. Make sure that at least 38 cm of supply wire extends into the roof opening.
3. If a furnace is to be controlled by the system, the two furnace thermostat leads must be routed to the roof opening. Make sure at least 38 cm of the furnace thermostat wires extend into the roof opening.
4. Route thermostat connector cable into the roof opening. Make sure 38 cm of cable extends into the roof opening, and 10 cm extends from the wall at the thermostat mounting location. See Section G-2.

G. Analog Thermostat & Cable Installation

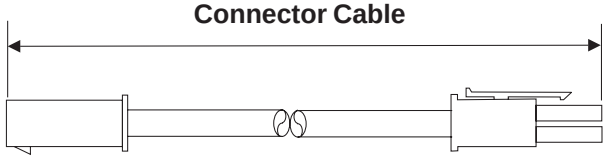
1. Analog Thermostat Location

The proper location of the thermostat is very important to ensure that it will provide a comfortable Caravan temperature. Observe the following general rules when selecting a location:

   a. Locate the Analog Thermostat 140 cm above the floor.
   b. Install the Analog Thermostat on a partition, **NEVER** on an outside wall.
   c. **NEVER** expose it to direct heat from lamps, sun or other heat producing items.
   d. Avoid locations close to doors that lead outside, windows or adjoining outside walls.
   e. Avoid locations close to supply registers and the air from them.
   f. A 2.5 cm diameter hole will be needed to route the thermostat connector cable female end through the wall. See Section F-4.

2. Thermostat Connector Cable Installation.
   a. A Thermostat Connector Cable is provided to connect the air conditioner control box to the thermostat. The male end of this connector goes to the thermostat. The female end of the cable goes to the air conditioner. See FIG. 15.

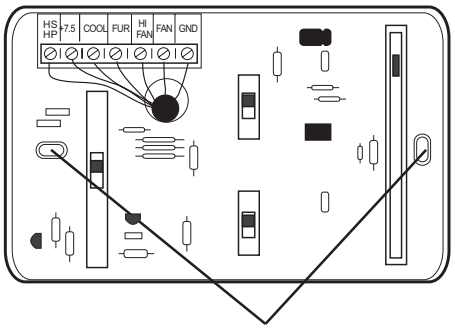
FIG. 15



   b. Choose the shortest, direct route from the 35.5 cm x 35.5 cm opening to the thermostat location selected.
   c. Consider where screws, nails or staples might contact the cable.
   d. Leave approximately 10 cm of cable extending through the wall for connection to the thermostat.
   e. Leave approximately 35 cm of cable extending into the 35.5 cm x 35.5 cm opening for connection at unit.

3. Analog Thermostat Installation.
   a. Connect the Thermostat Connector Cable protruding from the wall onto the pre-wired thermostat connector cable.
   b. Gently push the two connectors together until a snap is heard and the lock on the male connector is latched on the female connector.
   c. Gently feed the connectors through the hole in the wall until the thermostat can mount flush.
   d. Remove the cover from the thermostat by starting at one corner and lifting it off the base.
   e. Mount the thermostat level on the wall using the screws provided in the locations shown in figure. 16.

FIG. 16



   f. Place the cover on the thermostat and push until and audible click is heard.

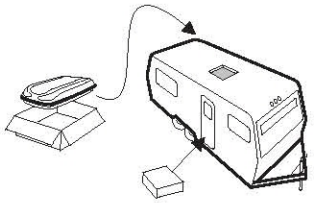
H. PLACING AIR CONDITIONER ON THE ROOF

⚠ CAUTION

This unit weighs approximately 45 Kg. To prevent back injury, use a mechanical hoist to place Air Conditioner on roof.

1. Remove the air conditioner from the carton and recycle. See FIG. 17.

FIG. 17

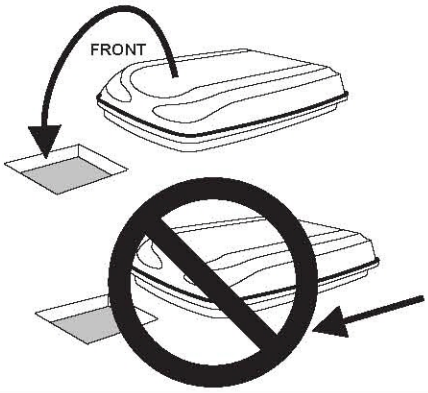


2. Place the air conditioner on the roof.
3. Lift and place the unit over the prepared opening using the gasket on the unit as a guide blunt end goes to rear. See FIG. 18.

CAUTION

Do not slide the unit. This may damage the roof gasket attached to the bottom and may create a leaky installation.

FIG. 18

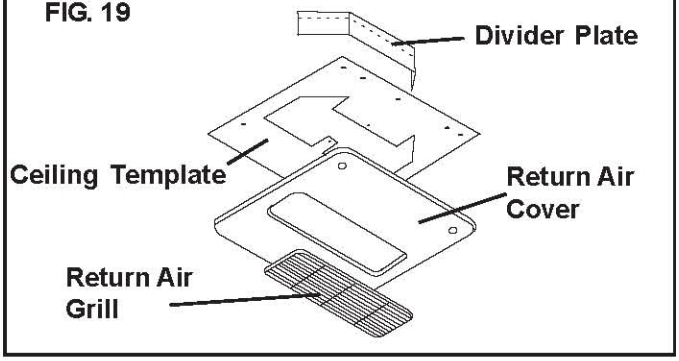


4. Place the Return Air Kit inside the Caravan. This box contains mounting hardware for the air conditioner and will be used inside the Caravan. See FIG. 17. This completes the outside work. Minor adjustments can be done from the inside of the Caravan if required.

I. INSTALLING THE AIR CONDITIONER

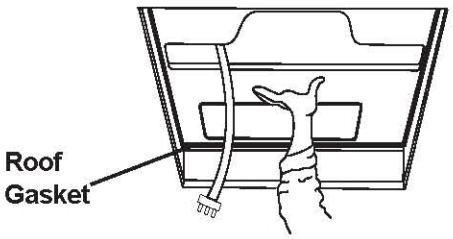
Installing unit with 3105007 or 3105935 return air kit.

FIG. 19



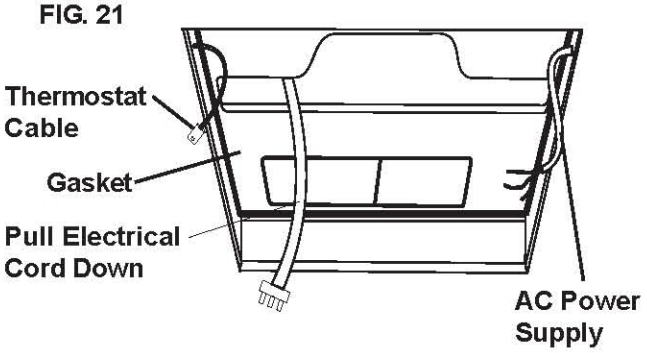
1. Installation Of Ceiling Template
   a. Check gasket alignment of the air conditioner over the roof opening and adjust if necessary. Unit may be moved from below by slightly lifting and moving. See FIG. 20.

FIG. 20 **Center Unit From Below**



   b. Remove return air cover and ceiling template from the 3105007 carton.
   c. Locate the four 20 cm long unit mounting bolts packed inside the analog control kit box.
   d. Pull down the unit's electrical cord into 35.5 cm x 35.5 cm opening. See FIG. 21.

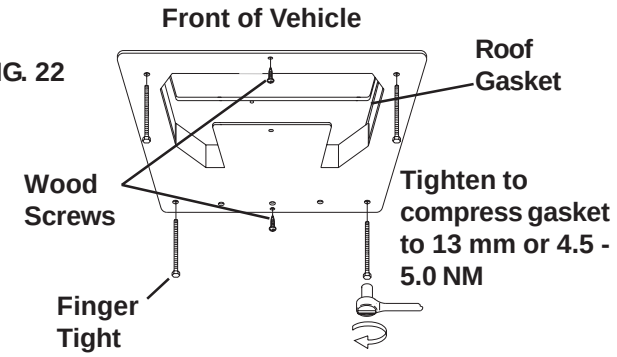
FIG. 21



   e. Hold the ceiling template up to the 35.5 cm x 35.5 cm opening. Be sure the large plate faces the rear of the Caravan.

f. Start each mounting bolt through the ceiling template and up into the unit base pan by hand. Install wood screw (not supplied) in each end of the ceiling template. This insures a tight fit of the return air cover to ceiling. See FIG. 22.

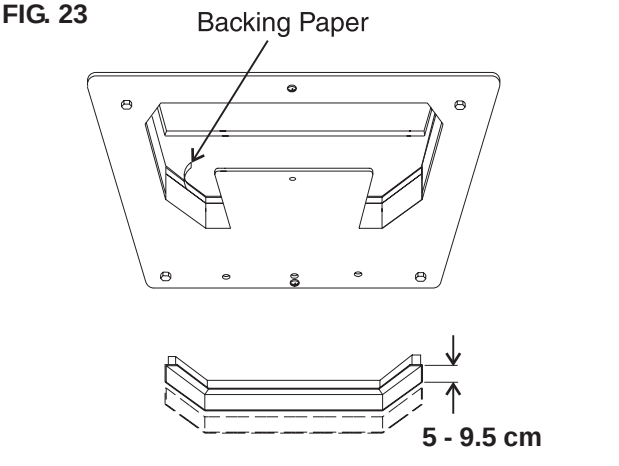
FIG. 22



Tighten mounting bolts to compress gasket to 13 mm this will be a torque of 4.5 - 5.0 Nm. The bolts are self locking so over tightening is not necessary. See FIG. 22.

2. Installation of Divider Plate
   a. Measure the ceiling to roof thickness:
      - If distance is 5 - 9.5 cm, remove perforated tab from divider plate.
      - If distance is 9.6 - 14 cm, remove no tabs.
   b. Remove the backing paper from double sided tape located on ceiling template. See FIG. 23.

FIG. 23

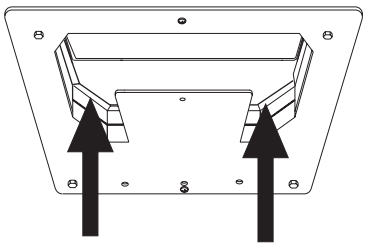


CAUTION

Improper installation and sealing of divider plate will cause the compressor to quick cycle on the cold control. This may result in fuse or circuit breaker opening and/or lack of cooling.

c. Place divider plate up to bottom of air conditioner base pan firmly. The foam tape on the divider plate must seal to bottom of base pan. See FIG. 24.

FIG. 24

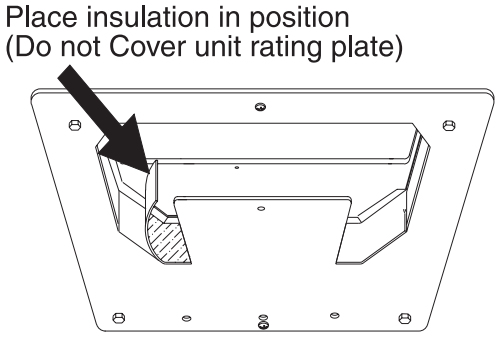


d. With slight pressure then push the divider plate against the double sided tape on the ceiling template.

Note: The adhesive on the insulation is extremely sticky. Be sure the part is located where desired before pressing into place.

e. Locate the 18 cm x 45.5 cm self -adhesive insulation supplied with the return air kit. Remove the backing paper from the insulation and carefully stick onto the ceiling template divider panel. See FIG. 25.

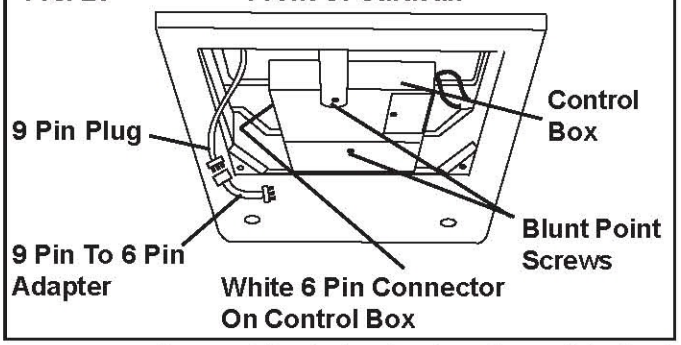
FIG. 25



- Excess width is intended to seal the divider plate to the sides of the 35.5 cm x 35.5 cm opening. This is to help prevent cold air discharge from circulating into the air conditioner return air opening.
- If the insulation is too high, stick excess height of insulation to the air conditioner base pan. Do not cover up unit rating plate.

f. Place the analog control box on the ceiling template with the white 6 pin connector plug on the side as shown in FIG. 26.

FIG. 26



g. Connect the 9 pin plug from the unit to the 9 pin plug on the adapter cable. The plugs are polarized and will fit only one way. See FIG. 26.

h. Place the cold control switch up through the base pan and on the second refrigerant tube from the bottom in the center of the evaporator coil. Make sure the spring clip is fastened securely to the tubing and the cold control surface is making contact with aluminum fins on evaporator coil. See FIGS. 27 & 27A.

FIG. 27

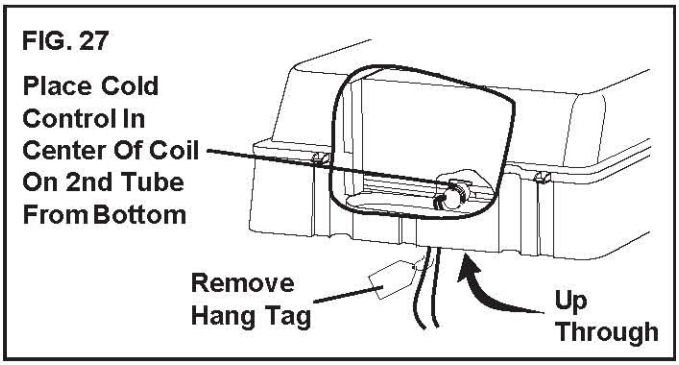
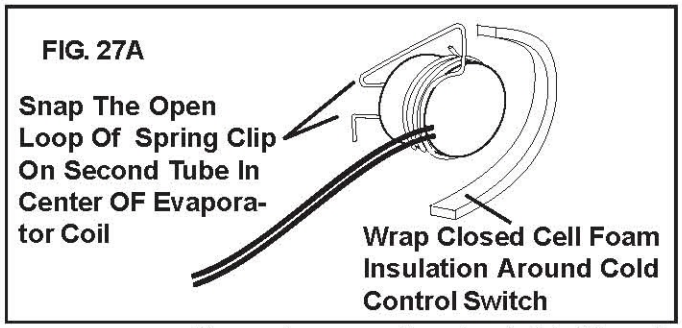


FIG. 27A


Snap The Open Loop Of Spring Clip On Second Tube In Center OF Evaporator Coil
Wrap Closed Cell Foam Insulation Around Cold Control Switch

- Keep wires away from heat strip (if applicable) and sharp edges to prevent damaging the wires. Use wire ties if necessary.
- Remove installation notice hang tag from freeze control.

i. Drive two 10 mm blunt point screws provided through the ceiling template and into the holes in the control box. See FIG. 26.

J. Wiring The System

Reach up into the return air opening and pull the remaining wires down.

CAUTION

Disconnect the positive (+) 12 volt DC terminal at the supply battery. Damage to equipment could occur if the 12 volt DC is not shut off.

1. Connection Of Low Voltage Wires
   a. Connect the previously run 12 VDC to the red and black wires protruding from the units return air opening. Connect +12 VDC to the red wire; –12 VDC to the black wire.
   b. Connect the previously run furnace thermostat wires (if applicable) to the blue/white wires protruding from the units return air opening. The polarity of these connections does not matter.
   c. Connect the thermostat connector cable into the mating connector from the control box.

⚠ WARNING

Disconnect 220 - 240 volt AC. Failure to follow these instructions could create a shock hazard causing death or severe personal injury.

2. Connection of 220 - 240 Volt AC Power Supply
   a. Route power supply line through Romex connector into junction box on side. Tighten connector, being careful not to pinch or short wires.
   b. Connect brown to black; blue to white; and green/yellow to green or bare copper wire using appropriate sized twist connectors.
   c. Tape the twist wire connectors to the supply wire to assure they don't vibrate off.
   d. Push the wires into the box.
   e. Install the cover onto the junction box.

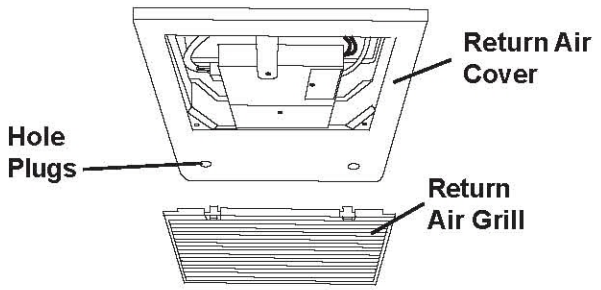
⚠ WARNING

This appliance is equipped with a 3-wire (grounded) system for protection against shock hazard. Make sure that the appliance is wired into a properly grounded 220 volt AC circuit and the polarity is correct. Failure to do so could result in death, personal injury or damage to the equipment.

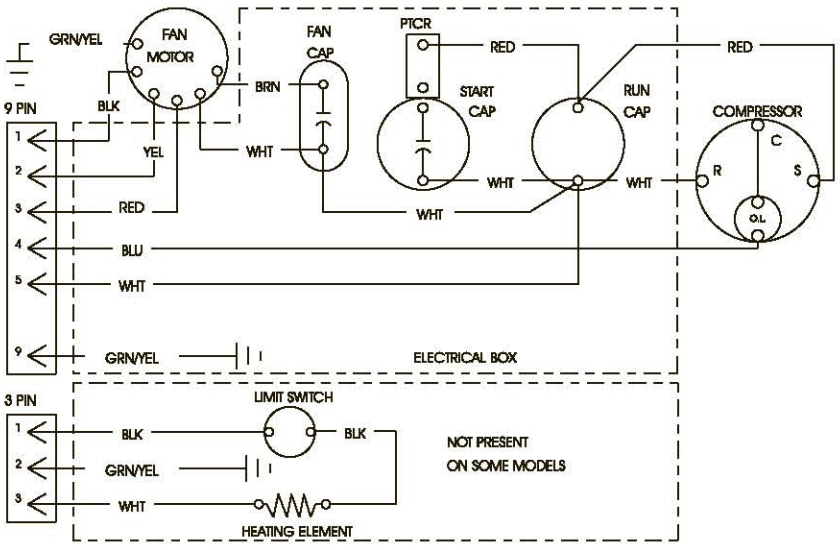
K. INSTALLING DECORATIVE INSIDE COVER

1. Remove the return air grill from the return air cover.
2. Place the return air cover up to the ceiling template.
3. Install cover to template with #8 x 10 mm blunt point Phillips head screws provided (6 required).
4. Reinstall filter return air grill into return air cover. Align tabs with mating notches and snap into place
5. Install two hole plugs into screw holes in back of return air cover. See FIG. 28.
6. This completes the installation of the air conditioner. We recommend that power be supplied to the air conditioner and check for proper operation. Refer to Operating Manual or Users Guide for a description of the air conditioner operation.

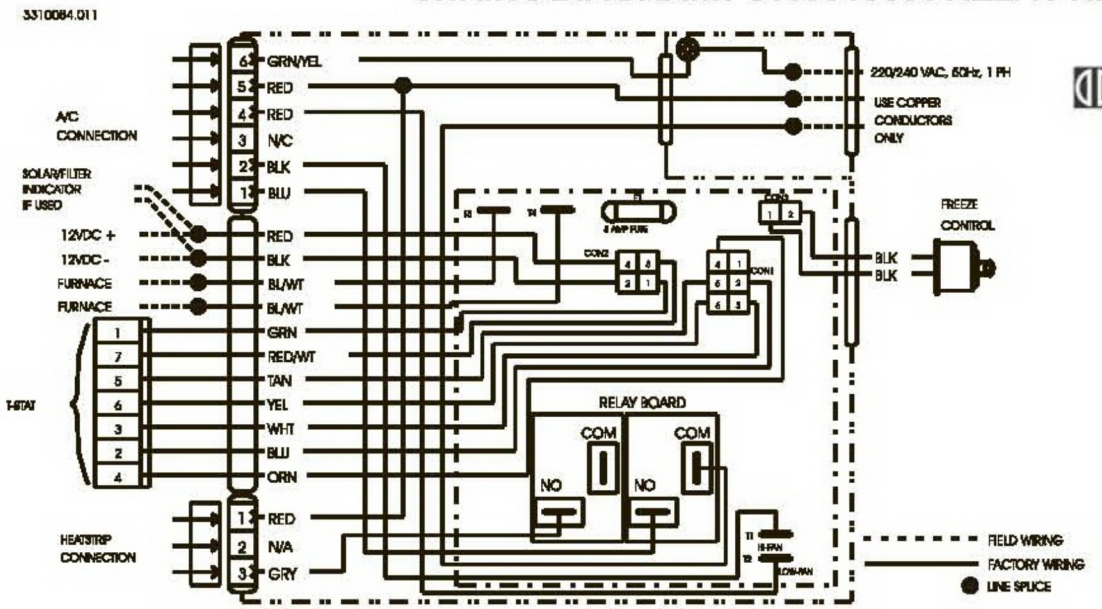
FIG. 28



B3351.533 AIR CONDITIONER - WIRING DIAGRAM



WIRING DIAGRAM FOR 3310086 RELAY KIT



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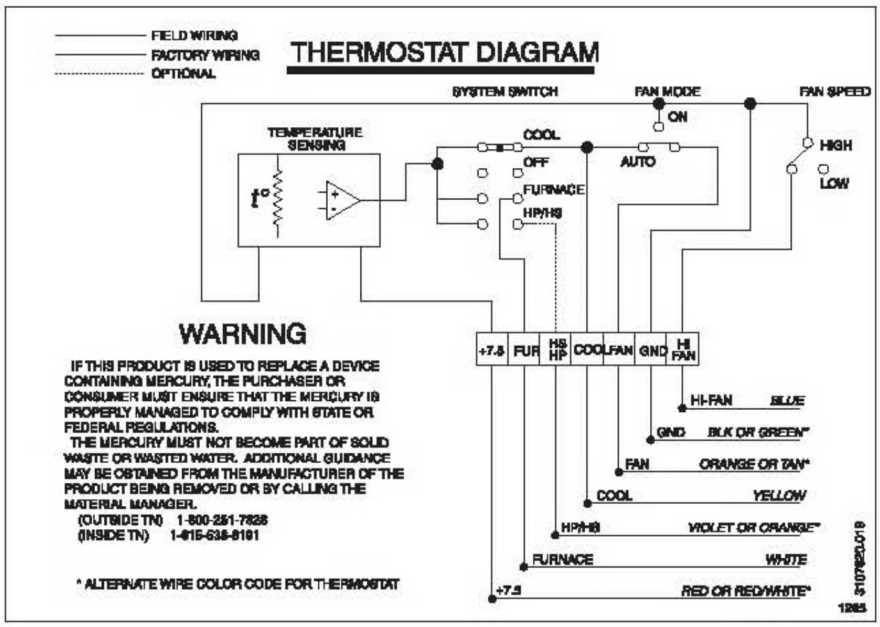
SERIAL No.

FOR A/C WITH OPTIONAL HEATSTRIP



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